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AN INTRODUCTION TO THEORY OF KNOWLEDGE

(Specially written for the use of B. A. Students of Madras & Andhra Universities being a Summary of Creighton: Introductory Logic Part III & Bosanquet: Essentials of Logic 4 Lectures.)

29 AUG 1934

P. C. Munuswamy, M. A.

Lecturer in Philosophy, Pachaiyyappa's College, Madras., Miller-Medalist, Author of 'A Short Introduction To Logic' etc., etc.

(THE MADRAS UNIVERSITY QUESTION PAPERS FROM 1923---1934.)

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PREFACE.

This book is frankly a summary of Creighton: *Introductory Logic, Part III* and Bosanquet: *Essentials of Logic, 4. Lectures.* These portions have been prescribed for B. A. in Logic and Theory of Knowledge in both Madras and Andhra Universities. Though the title of the book is arbitrary to some extent, yet it is comprehensive enough to include both logical and epistemological portions. The Madras University Question Papers have been appended. It is hoped that the book will perfectly satisfy the requirements of those for whom it is designed.

August 1934
Madras

The author

CONTENTS.

Page

CHAPTER I.

The Law of Evolution and its application to thought-process 1

Exercise I 4

CHAPTER II.

Judgment ... 5

Exercise II. 6

CHAPTER III.

The Main Characteristics of Judgment ... 8

Exercise III 9

CHAPTER IV.

The Laws of Thought 11

Exercise IV 13

CHAPTER V.

Types of Judgment 14

Exercise V. 24

CHAPTER VI.

Inference 26

CHAPTER VII.

Inference—(*contd.*) 33
Exercise VI 49

CHAPTER VIII.

Science and Philosophy 51
Exercise VII 55

CHAPTER IX.

Bosanquet's Theory of Knowledge ... 56
Exercise VIII 65

CHAPTER X.

Bosanquet's Theory of Judgment 67
Exercise IX 69

CHAPTER XI.

The Characteristics of Judgment According to Bosanquet 70
Exercise X 76

CHAPTER XII.

The Relation of Logic to Knowledge ... 77

Exercise XI 82

The Madras University B. A. Question Papers (1923--34) 87

CHAPTER I.

THE LAW OF EVOLUTION AND ITS APPLICATION TO THOUGHT-PROCESS.

1. Introduction.

In formal logic we study the various processes of thought in a detached way. In it we treat various logical activities like judgment, reasoning etc., as if they are separate and distinct, each existing as it were, on its own account. In other words, we treat the proposition and syllogism as different processes. Traditional logic is concerned with the validity of a given argument. It tries to find out whether a piece of reasoning is correct or incorrect by applying the rules of logic. Further it studies the different forms or types of thinking. But modern logic explains thought in terms of its own development. Thought remains identical in all its developing forms or stages. For modern logic judgment and inference are not different processes but they are a development of one and the same process. They differ like child and man, or a bud and a flower. In a word, traditional logic is concerned with the *normative* aspect. As Mellone expresses, "The point of view adopted in modern logic is, that in the formation of ideas, in judgment, in reasoning, we have not three separate processes but a development or expansion of one and the same process."

We have said that thought is a developing process; so we can apply the method of evolution to thought-process. Evolutionary method as applied to thought brings to light its dynamic nature. And consequently we will find that various processes of

thought differ only in degree of complexity from one another. Judgment and inference will appear as stages in the intellectual development.

2. The Law of Evolution and its application to logic

Etymologically speaking, evolution means 'unfolding' or 'unrolling.' Evolution, as a biological doctrine, states that all the animals and plants which we see around us have been emerged from simple beings called 'amoeba', by a process of gradual development. Evolution is a process from simple life to complex through countless changes in structure and function. In other words, amoeba has taken countless number of years to develop into higher forms of life.

Then, evolution is development from simple to complex. The most important feature of an organism at a lower level is complete lack of structure, e.g., an amoeba is composed of homogeneous protoplasmic substance throughout. But a more developed organism is composed of heterogeneous substances, eg., a rabbit is composed of bones, muscles, tendons, blood, etc. Thus we see a change from the simple to complex causes *differentiation* in structure. As we go up in the scale of evolution, structural differentiation becomes evident. But this is not all. There is also differentiation in function. The functions of of an amoeba are narrowly limited to assimilation and reproduction. It does not possess various organs to discharge various activities. But when we come to a higher stage of life, there is functional differentiation. A rabbit has separate organs for the discharge of special functions.

The process of evolution does not mean structural and functional differentiation alone. Simultaneously there is also another thing called

integration. In a low organism like amoeba, different parts of the its body are not systematically connected together; i.e., one part of it does not seem essential to the growth of the other. If we split an amoeba into two, both the parts can go on living. But this is hardly possible in a developed organism like a frog, all the different parts of it are organically related to one another; if one part is cut off, the other parts will be affected. In a word, all the parts are *integrated.* In a low organism the different parts are not closely knit together whereas in a highly developed organism all the parts are integrated or unified. *Thus the process of evolution involves differentiation and integration both of structure and function.*

We shall now apply the law of evolution to thinking. Thinking in its infancy is simple and undifferentiated. It takes things in a lump, without making any distinction. As thinking develops, the mere presentation is analysed and discriminated. First the child cannot make any difference between its own body and the objects surrounding it. It cannot distinguish one person from another, but as it grows it can find the difference between one person and another. The movement of thought, therefore, means differentiation—discrimination and analysis.

Simultaneously with the process of differentiation, integration is also present. The child and the uneducted man not only fail to make distinctions where they are found, but their knowledge is also fragmentary. The parts of their knowledge are not connected together. In a word, it is not *integrated.* But as thinking develops the various pieces of our knowledge are connected and systematised. It is not only necessary to discriminate the various parts of knowledge, but also these parts must be interrelated

and arranged in an order. Knowledge in its higher forms is a system.

EXERCISE I.

1. What is the difference between traditional and modern logic?

2. What is the general law of evolution? Explain what is meant by a change from the homogeneous to heterogeneous.

3. State the law of evolution and apply it to thought-process.

CHAPTER II.

JUDGMENT.

What is the simplest act of thought? Is there anything in thought corresponding to cell in biology or atom in physics? Judgment is the unit of thought. It is the most simple and elementary piece of thinking. It is an indivisible act of thought. It is both the act and result. If it is verbally expressed, it becomes a proposition. It is only in a proposition we find the distinction between the subject and predicate, e.g., Iron is a metal. Iron and metal are concepts. Apparently judgment seems to be a combination of two concepts. Hence concept seems to be more primitive than judgment.

In fact, judgment is prior to concept. The formation of a concept is the result of the judging activity of mind. The concept 'iron' is not mere sound; but it represents a number of judgments like 'it is hard' 'it is malleable' etc., We cannot think a term *without thinking something of it*: The word 'parabola' is a jargon to a non-mathematician, but it represents a number of judgments to a mathematician. Thus the essence of judgment is assertion. It asserts something; without the element of assertion it is a mere sound. When I say 'rose', it stands for a number of assertions about it.

A judgment is either true or false. It is absurd to talk of a concept being as true or false. For example, to say that 'crow' is true or false is to utter nonsense.

Every judgment gives some information or knowledge. It is the judgment alone that can give

us knowledge. The minimum amount of knowledge is judgment.

Further in certain judgments like Hot! It is raining! etc., we do not come across with the typical form of judgment having subject and predicate. In the above examples, judgment seems to be ultimate.

Judgment is the content of one idea. It is a single meaning. We never think in separate terms or ideas. All thinking involves connection and discrimination. Judgment is a unity of distinguishable parts. The relation between subject and predicate is within an idea or meaning and not between two ideas. Hence we conclude that judgment is not a union of two concepts.

EXERCISE II.

1. What is meant by judgment? What is the difference between judgment and proposition.

2. 'Judgment is the union of two concepts' Discuss.

CHAPTER III.

THE MAIN CHARACTERISTICS OF JUDGMENT.

1. Universality

The term universality is ambiguous. In formal logic universal judgment or more correctly universal proposition is one in which the subject is quantified by the word 'all' e.g., all men are mortal. A particular proposition is one in which the subject is quantified by some or other partitive words. But we are not concerned with this meaning. When I say a judgment is universal, it means that it is true for every one, knowledge is not fanciful or momentary. When I say 'water is a liquid' it is not only true for me but it is true for others as well. Truth is not purely subjective but it is true for all at all times. In a word, truth is objective. Objectivity of thought means that truth is independent of individual whim or fancy.

2. Necessity

Judgment is necessary. When a person judges he is not free to reach this or that conclusion at well. We cannot believe what we choose, but we must believe what we can. Truth is not a matter of taste. Truth is what we are obliged to think. We are always compelled to reason in a particular manner. The necessity of judgment depends upon its connection with some other fact.

3. Judgment is both Analytic and Synthetic

The function of thought is to build various parts of knowledge into a connected whole. This is what

is meant by saying that judgment is both *analytic and synthetic*.

The terms 'analytic' and 'synthetic' may have different meanings. Etymologically analysis means splitting and synthesis means putting together. In the physical realm these two processes are incompatible. For we cannot split and join a thing simultaneously.

Another meaning is also given to these terms. An analytic judgment is one in which the predicate is obtained by analysing or bringing what is contained in the subject. An analytic judgment merely brings what is already implied in the subject e.g., A traingle is a figure having three angles. A synthetic judgment states something which is not already implied in the subject e.g., A traingle is drawn on the black board yesterday. But even with this meaning we are not concerned in logic.

In logic the processes of analysis and synthesis are not incompatible. We can connect and discriminate at the same time. Suppose when I say 'Gold is heavy' we have analysed the concept gold and brought a new feature to light. This is what is meant by saying that a judgment is *analytic*. But it does not stop there. It also affirms the union of the new quality with the other properties of 'gold'. In other words, it not only lays bare a new feature but also connects the new feature with the others of the same thing. This is an act of *synthesis*. Judgment points out the different parts of a thing and at the same time asserts the union of these different parts as making up one whole. In a word, it is an identity in difference. If there is pure difference it is meaningless e.g., Gold is man. And it is equally absurd to assert pure identity like iron is iron. As Joseph says 'every judgment then is at once

analytic and synthetic: for the act of judment at once holds different elements apart and recognises them as elements in a single whole' 'Fire producing heat' is the content of one idea, though we may distinguish various elements in it. Hence we conclude that judgment is not only analytic but a synthesis of distinguishable elements.

4. Judgment is constructive

Judgment is also constructive. Really this is not a new characteristic of judgment but it is its function. When we say that judgment is constructive, it means that judgment builds up a system of knowledge. The work of thought is to form knowledge into a connected system.

EXERCISE III.

1. What do you understand by the universality of judgments? What is the distinction between the universality of judgment and that of a proposition?

2. What is meant by necessity of judgments.

3. Explain how it is possible for a judgment to be at once both analytic and synthetic.

4. Explain what is meant by a 'system' in knowledge.

5. Give a short account of the properties of judgment according to Creighton.

6. Explain the meaning of the terms 'analytic' and 'synthetic' and show how the judgment is both analytic and synthetic.

7. 'Judgment is a synthesis of distinguishable elements' Explain..

8. 'Judgment is a comparison of concepts' Discuss.

CHAPTER IV.

THE LAWS OF THOUGHT.

The word 'law' is ambiguous. A law in physical sciences means a uniformity of nature. In moral and legal sciences a law means an injunction or precept imposed by an external anthority to be obeyed by others. Such are the laws of morality and the laws of land. But these laws can be violable. In what sense, can we interpret the laws of thought. It is evident that they are not laws externally enforced upon us. But it is true that they are violated very often. Then, they are to be considered as the fundamental principles of thinking always operative in all normally constituted individuals. They are four in number viz., the Law of Identity, the Law of Contradiction, the Law of Excluded Middle and the Law of Sufficient Reason.

The Law of Identity is usually stated as A is A. This is a mere tautology. The bare statement of the law, is an unmeaning expression. As applied to judgment it denotes identity in difference, unity in diversity. Gandhi changes, or is different from day to day and from year to year. But he always remains identical with himself: he is the same Gandhi who is in south Africa in the middle of life and who is amidst the Harijans in his old age. This is an instance of the application of the law to a person or a, thing. But strictly speaking, the law applies only to judgment.

Another interpretation of this principle has been offered by Boole and Jevons. According to them, every judgement is the expression of an identity between the subject and predicate, The judgment,

'Calcutta is the largest city in India' is simply a case of A is A. It can be expressed as follows omitting the copula and substituting it by the sign of equality.

Calcutta=the largest city in India.

Judgment from this point of view is simply an equation. But there are serious objections to this view. Such a judgment like 'B is greater than A' cannot be expressed in an equation. This view breaks down if we represent 'All crows are birds' in an equation like crows=birds. Hence the form A=A cannot be regarded as the type to which all judgments conform.

Judgment affirms both identity and difference. Iron is fusible, This table is made of oak. In all these judgments there is the assertion of the unity of different properties. Every judgment is the content of one idea. Fire causes heat is a single content or idea, the nature of fire expanded into one of its properties.

The Law of Contradiction is stated as follows. A cannot be A and not-A. It is evident that this law states in a negative form the same characteristics of thought as the Law of Identity. We cannot assert at the same time that Kalidasa is both a poet and not-poet. Truth is not a matter of taste; it must be consistent with itself. If a judgment affirms that iron is a metal, simultaneously it excludes the assertion that it is not a metal. Here we must draw a distinction between *contraries* and *contradictories*. Hot and not-hot are contradictories but hot and cold are contraries because there is a middle ground between the contraries. The law applies only to the contradictories.

The Law of Excluded Middle is a necessary corollary of the above laws. A is either B or not-B.

To affirm the one is to deny the other. Every judgment is double edged i.e., it both affirms and denies at the same time. The statement 'This railways does not use steam power' implicitly means that it uses electricity. Negation does not imply a bare denial but implies both affirmation and negation.

The Law of Sufficient Reason can be stated as follows: for everything there is a sufficient reason why it is so rather than otherwise. Every judement is at bottom connected with every other. This is also called the Law of Universal Causation which tells that every event has a cause.

The laws of thought can be ultimately reduced to one great principle, that of the systematic nature thought. In a word, knowledge is a system.

EXERCISE IV.

1. What are laws of thought? What is their importance in logic.

2. What objections are there to employing the sign of equality to represent the subject and predicate of a judgment.

CHAPTER V.

TYPES OF JUDGMENT.

By thinking knowledge is built up; and various forms or types of judgment are involved in the growth of knowledge. The different types of judgment represent different orders of knowledge. The following are the important types of judgment.

(1) Judgment of Quality.
(2) Demonstrative Judgment.
(3) Judgment of Comparison.
(4) Judgment of Quantity.
(5) Categorical Judgment.
(6) Hypothetical Judgment.
(7) Disjunctive Judgment.
(8) Judgment of Individuality.

1. Judgment of Quality

The judgment of quality is the most primitive one. At a low stage of intellectual level, it is the simple qualities of objects that arrest one's attention e.g., Hot! Bad! It hurts! In these example we have some undefined complex presentation. The children's judgments are vague and indefinite. Some simple and prominent qualities strike to their mind. Their judgments lack discrimination or analysis. It is common that the child calls every man 'papa' and any black object as 'Crow'. Their knowledge is based on qualitative impressions. The Judgment of Quality is the starting point in the development of knowledge.

2. Demonstrative Judgment

Demonstrative judgment marks a higher intellectual level than that of quality. The judgment

of quality naturally expands into a demonstrative judgment. In this judgment the demonstrative pronoun or particle points out a given quality in the external world. '*This* is hot', '*Now* it is raining', '*Here* it is dark', are examples of this kind of judgment. Unlike the judgment of quality, such particles indicate an effort to distinguish elements within the complex presentation. The knowledge furnished by such judgments are merely spatial and temporal location of given qualities.

3. Judgment of Comparison.

Knowledge does not enter into our minds from outside; but it is the result of the interpretative activity of the mind. We are not only contented with mere knowing of qualities or things but we also wish to distinguish various parts of a thing, and to compare one with another e.g., This is redder than that. This end of the cane is heavier than that In these judgments we find more of intellectual analysis than the earlier judgments. 'Redder' 'Hotter' 'less painful' are terms that go beyond mere quality by introducing the conception of more or less. In other words, we are in the begining of quantity.

4. Judgment of quantity.

The judgment of comparison naturally leads us on to the judgment of quantity. For the element of comparison is the basis of counting or measuring. This is also called the judgment of measure. When we measure, we express a relation of the parts with which we are dealing to some common unit or standard. The judgment that the stick is 10 ft. long means that if the stick is compared with a foot rule, it will be found to be ten times long. It is important to notice that all measurement involves *com-*

parison. Firstly some unit or standard of measurement is arbitrarily chosen ; then the judgment states simply the relation between this unit and the object measured.

The judgment of quantity is *relative* in character. It does not express any thing about the real nature of a thing. It merely indicates a relation of anything to a particular arbitrary standard. In spite of its relative character the judgment of quantity plays an important part in the development of knowledge. The ideal of science is to reduce everything to quantitative measurement and express them in mathematical formulae. It is because of the amenability of physics to quantitative investigation that made it an exact science. Even in psychology, now a days, we find quantitative investigation playing an important part. And in fact applied mathematics is nothing but the application of mathematics to physical problems.

5. The different meanings of the word 'cause'.

The idea of cause is very primitive to human mind. The child and the savage consider that all changes in nature are produced by the agency of living beings. In the lowest stage of mental development, the child and the savage think that every object is endowed with life and it is more or less similar to him having passions and emotions. This stage is called *animism* because each object is supposed to possess a spirit or anima The following types of judgments like 'Vayu blows' 'Agni burns', represent the animistic level of intelligence. Gradually the distinction between living and non-living emerges and the people no longer reckon all physical objects as animate but try to explain the natural events as due to the action of

spirits or supernatural beings. This kind of explanation is called *anthropomorphism*. At this stage, they explain the behaviour of things as due to the action of spirits. The popular mythology and the fairy-tale belong to the level of supernaturalistic or anthropomorphic explanation.

Thales was the first in the history of philosophy and science who ventured to explain things *naturally* discarding all modes of mythological and supernatural explanation. It must be said to his credit that he laid the foundation for scientific explanation.

The popular mind still clings to the idea of anthropomorphism. It usually reckons the cause as an active factor and the effect as a passive one. It is said that cause *produces* the effect. Suppose a stone breaks the window glass, the stone is considered as the cause which produced the effect (breaking of the glass). Popularly 'cause' is considered to have some power, or potency to produce some other thing. But this view is wrong.

According to modern science causal connection is mechanical and purposeless. If two events are invariably and necessarily connected, we say that they are causally connected. The falling of mercury in the barometer is preceded by the lowering of the atmospheric pressure. These two events are *mechanically* connected; one does not produce the other with any purpose. Causality is a mechanical and purposeless sequence of events. Further causal relation is *continuous*. We cannot separate cause and effect, as beads on a string. The causal connection is both reciprocal and reversible. We can go from the cause to effect or from the effect to cause.

The law of conservation of energy has added a new element to the idea of cause. It insists on the

quantitative identity of cause and effect. It states that the amount of energy which the cause represents has been transformed without loss, and reappears in the effect. Wherever a regular sequence in events indicates a necessary connection, the events in question are said to exhibit causal relation. This is the real meaning of cause in science. Causal statements are usually expressed in hypothetical form as, If A, then B, If a metal is heated, it expands.

6. The Categorical Judgment

A categorical judgment asserts directly without any condition. It is a mere statement of fact. Its symbolic form is A is B. This room is sultry, Shivaji was a great warrior etc., are examples of this form of judgment. In formal logic a number of judgments are grouped under this form, such as particular judgment, singular judgment, collective judgment, and generic judgment. Strictly speaking, generic universals are hypothetical judgments. The defect of formal logic is that it does not go behind the grammatical form. Categorical judgment refers to the perception of facts and events. They assert facts brutally. In sense-perception and in simple historical narration, assertions are made directly and categorically regarding things aud events. A categorical judgment is gratuitous and irrational. Universal propositions according to formal logic are categorical. But some universal propositions like generic universals are strictly hypothetical.

7. The Hypothetical Judgment.

A hypothetical judgment does not assert directly the existence of a fact, but states the connection between a supposition or condition and its consequence. It is a conditional statement. It states a causal connection.

The symbolic forms which it assumes are the following: If A, then B; If A is B, then C is D and If A is B, then it is C. If water boils, it is at a temparature of 212 degrees F., If a stone is left unsupported it falls to the ground, etc., are concrete examples of hypothetical judgments. This judgment belongs to abstract science, but it is only making explicit what is implied in the universal affirmative. This type of judgment expresses the causal nexus. In a word, it is a judgment of causality. Causal statements are expressed in hypothetical form. It asserts a necessary connection or a general law.

It is not a mere brutal assertion. It is not a mere statement of a fact but a statement of a causal connection. It marks a higher level in the intellectual development. Hypothetical judgments are expressions of scientific laws. If A, then B marks the scientific level of thinking. Science constantly states its conclusions in hypothetical judgments. In the judgment 'these are rose shrubs' the main purpose is to identify the shrubs given in perception with the class of rose shrubs. But when I say, 'ignorant people are superstitious' the judgment does not refer directly to any particular individuals, but states the necessary connection between ignorance and superstition. *In spite of the categorical form, the judgment is essentially hypothetical in character.* Its meaning can be stated in a hypothetical judgment: If a man is ignorant, he is also superstitious. As we pass from the judgments of sense-perception and memory, to a statement of theories and laws, the hypothetical element becomes more and more prominent.

The hypothetical judgment differs from the categorical not in *form* but in *content*. A judgment which is essentially hypothetical in character can be

expressed in a categorical form e. g., All material bodies gravitate' can be expressed 'If there is a material body it will gravitate'. It must be remembered that it is not the *form* but the *purpose* or *function* of a judgment which determines its character. Generic universals are statements of necessary connection, hence they are capable of hypothetical statement. In formal logic the distinction between the universal proposition and particular proposition is based upon grammatical form and not upon meaning. It confuses the form with meaning, for the universal proposition includes both generic universal and collective universal. The universal judgment is distinguished from the particular judgment not by the presence of 'all' but by the predication of a universal law or connection. Not all the universal propositions are capable of hypothetical form e.g., This is an oak tree, Plato was a great thinker. As Bosanquet says 'Where no rational nexus is traceable, but coincidence in fact, however general, we cannot admit that the essentials of hypothetical judgment are present".

Hypothetical judgments express causal connections. Science merely states that if an event precedes, invariably another event follows. Hence scientific knowledge is hypothetical in character.

8. Disjunctive judgment

A disjunctive judgment is one in which an alternate predication is made. Its symbolic forms are A is either B or D, Either A is B or C is D. The important point about the disjunction is that it makes negation positively significant. 'This signal light shows either red or green' Here we have the categorical element: this signal light shows some colour. There are also two hypothetical judgments, If it shows red, it does not show green. If it does

not show green it shows red. We cannot make it out of these two hypothetical judgments alone; they do not give you the assertion 'it shows some colour'. Hence it is sometimes said that disjunctive judgment is a union of categorical and hypothetical.

The usual contention among the logicians is that disjunction is based on doubt or ignorance. If we say 'Gold is either an element or a compound', it is not a mere statement of ignorance. "Even if you do not know *which of the two* it is, how do you know that *it must be one*". Evidently we cannot make such an assertion about the signal without knowing something of the general system of things to which the signal belongs, and of the signal's relation to other things in that system. Only on the basis of a knowledge of elementary physics, we can say that a body is either a solid, liquid or a gas. It is only with a knowledge of geometry we can say that a triangle is either a scalene or isosceles or equilateral. If you can assert that a particular thing is this or that, we must know the systematic relation of those things. It is only when we understand the systematic connection of things in the field in question, that we are able to express these connections in the form: Either B or C. Then, disjunction is not an expression of ignorance but a mode of knowledge. How can it be mere ignorance when we know the presence of one excludes the other? The so-called disjunctions like. He is either angry or jealous differ not in *principle* but only in *perfection* from the ideal disjunction. There can be imperfect disjunctions and not disjunctions of ignorance. Every disjunction gives some positive knowledge.

A disjunctive judgment, then, presupposes systematic knowledge and consequently marks the highest stage in the evolution of thought. It is

regarded by modern logicians as expressing the aim of thought more fully than the previous forms: for it implies the existence of systematically connected world. And in all real thinking we are seeking to connect the facts together by means of general principles into a system.

The categorical judgment asserts something brutally; it is merely a statement of fact. It refers to history and facts of perception. A hypothetical judgment marks a higher level than that of the categorical. It states a causal connection; it is a judgment of causality. Disjunction completes the aim of thinking activity; it marks the climax of thought; it deals with systematic knowledge.

9. Judgments of Individuality and Teleology

Science makes use of the causal explanation; it presupposes that events in nature are externally connected with one another. Causal sequence is mechanical and purposeless; for example the falling of mercury in the barometer is preceded by lowering of the atmospheric pressure. These two events are mechanically connected; one does not cause the other with any purpose.

Further causation leads to infinite regress (*anavasta*). In other words it shows that one phenomenon is connected with a second, a second with a third, a third with a fourth and so on *ad infinitum*.

It is evident that this category is inadequate to represent certain things where there is purpose or individuality. New categories alone can be applicable to such phenomena. According to the principle of causation whole is a mere *sum* of the parts.

There are certain wholes which are *greater* than the sum of its parts. Judgments of individuality refer to such unique wholes having a definite nature of its own. A living organism is a unique whole having individuality.

Scientific explanation is stated in causal terms. In other words it makes use of the principle of causality. We have seen already that causal explanation is a mechanical one. But there are sciences where causal explanation is inapplicable. In biology it is usual to explain certain structures of plants and animals as *purposive*. It makes use of another form of explanation i.e., the judgment of *teleology* or *purpose*. In biology the behaviour of organisms are explained as adaptation to the environment. For example, the shrinking of an animal if it is pricked, can be explained as purposive—the purpose consisting in receding from the harmful stimulus.

"True or ideal disjunction is a generic judgment whose content is developed or interrelated by the aid of the hypotheticals".

EXPLANATION

A disjunctive judgment is not an expression of ignorance but a mode of knowledge. In a disjunction systematic connection of things is brought to light. In a word, a disjunctive judgment deals with system. It is a combination of hypothetical and categorical judgments. In the example, brass is either a metal or an alloy, there is the categorical element that brass is some subtance. There is also the hypothetical element. If it is a metal it is not an alloy; if it is not an alloy it is a metal. Disjunction is not merely a combination of two hypotheticals. They do not alone give the systematic connection

between alloy and metal. Hence a disjunctive judgment is a union of categorical and hypothetical.

"Taken all as a mass, facts in a system are conjunctively connected, but taken in distinguishable relations, they are disjunctively related".

EXPLANATION

This statement brings out the essential features of a system. The facts in a system are connected together. A system is made up of a number of conjunctive judgements. But it is more than a mere grouping of facts. It is not merely a connected whole but interconnected and interrelated whole. In other words the disjunctive element is prominent in a system. The facts in a system are *interdependent*.

EXERCISE V.

1. Explain how we pass in the development of knowledge from Quality to Quantity.

2. Give a critical account of the Judgment of Quantity.

3. State the different meanings of the word 'cause'. Which of them seems to you satisfactory?

4. Do you agree with the view that disjunctive judgment is not a judgment of doubt but a mode of knowledge?

5. What is the relation between the categorical and the hypothetical judgments.

6. "The difference between the categorical and hypothetical is one of *content* and not of form". Discuss.

7. What is the relation between categorical judgment and categorical proposition?

8. "A true or ideal disjunction is a generic judgment whose content is developed or interrelated by the aid of the hypotheticals". Explain.

9. "Taken all as a mass, facts in a system are conjunctively connected, but taken in distinguishable relations, they are disjunctively related". Explain.

10. How does the stand-point of Judgments of Individuality differ from that of Judgments of Causality? What is meant by an 'infinite regress'?

CHAPTER VI.

INFERENCE.

1. Nature of Inference

Inference is an intellectual process by which from certain premises we draw a conclusion. To infer is to arrive at a truth not directly through perception, but as a consequence of some truth or truths already known, e.g., when I see a circle of stones I infer that they were arranged by human hands. The truths from which we start are the premises, that which we reach is the conclusion. To infer is to show the necessary connection of facts. Inference is a process of going from the known to unknown. The words 'for', 'because' 'therefore' 'consequently' indicate that inference is made in any statement. Inference is a deep insight into the connection of things.

Inference is divided into (1) deduction and (2) induction. Deductive inference proceeds from a universal to particular We start with certain facts which we already know and show that some result follows from them.

All men are mortal
Plato is a man
∴ Plato is mortal.

In induction, we observe certain particular phenomena and try to discover from them the law or principle. Inductive inference is thus a process of reading an inference out of particular facts. Peter died, John died, from these we infer that all men die.

Ultimately the condition of inference is always a system. It is only when we find systematic

connection of facts that we can have inference. Infence takes place within a system where the parts are so held together by a common thread that you can judge from some of them what the nature of others is. The rain will come because barometer is falling. In this statement a new fact is reached because of the systematic connection between the falling of mercury and the rain.

2. The Conditions of Inference

Inference is a mental process by which we can go from one fact or facts to other facts. The truths from which we start are the *premises*, that which we reach is the *conclusion*. The two main requisites of inference are '*necessity*' and '*novelty*'. By necessity, we mean that the conclusion must necessarily follow from the premises. By novelty we mean that the conclusion must be novel or something new. It must be an addition to our knowledge. It is going from the known to unknown. In other words we have no inference unless the conclusion is (1) necessary from the premises (2) and also goes beyond the premises.

Now we shall show that these features of inference are present both in deduction and induction. In deduction we have two premises and a conclusion.

All metals are elements
Gold is a metal
∴ Gold is an element.

The conclusion necessarily follows from the premises; about the necessity none can dispute. It is clear that the difference between the premises and the conclusion cannot be absolute; if not, there would be no connection between them, consequently there can be no inference. Inference implies some

continuity in thinking and continuity involves some element that is identical throughout the process, otherwise the successive steps cannot be linked. We cannot get a conclusion from *any* two premises e.g.,

All dogs are animals
All men are mortal
no conclusion.

As Bosanquet remarks 'Inference cannot possibly take place except through the medium of an identity or universal which acts as a bridge from one case or relation to another'.

But very often the novelty of a syllogistic inference is denied. J. S. Mill asserts that there is no novelty in a syllogism; the conclusion merely repeats what is contained in the major premise. But a moment's reflection will show that there is also the element of novelty in the syllogism. The conclusion cannot be novel if we consider the major premise as a mere *summation of particulars*. As Mellone says "It is not an aggregate of particular truths; it does not refer merely to a collection of things". Scientific universals do not refer to any definite number or group of individuals. It asserts the connection of attributes. It is hypothetical in character. 'All men are mortal' can be expressed hypothetically thus 'If human, then mortal'. Hence the conclusion is not contained in the major premise. In fact if all the particulars have been examined then syllogism is useless. New knowledge can be obtained by inference where 'new' knowledge means, not knowledge unconnected with the premises, but knowledge that we did not have in our possession.

The novelty in a syllogism consists in making explicit in the conclusion what is implicit in the

premises. If we consider that the conclusion is already contained in the major premise, then the minor premise becomes superfluous. The necessity of a minor clearly brings out the novelty of the conclusion. From the relative positions and revolutions of the heavenly bodies, an astronomer may *deduce* a conclusion that an eclipse of the sun will take place at a particular time. Is it not novel?

We shall now show that the two conditions of inference are also present in induction. It is at once evident that an inductive generalisation is novel. Is there also necessity in induction? However numerous the particular instances may be they do not give a universal law. In fact induction is not based on the counting of instances (*bhuyodarsana*) but on the scientific analysis of content. It is not a jump from the particular to the universal; but it is a complex process involving a number of steps like observation, hypothesis, verification and generalisation. Its necessity consists in scientific analysis. As in the case of the conclusion in a syllogism which the universal is implied in the premises, so also in induction is implicit in the particular instances. The necessity in induction consists in seeing that what is implicit in particular becomes explicit in the universal. As Bosanquet says "Inductive proof rests, like all inference on systematic and necessary connection of content. The observation does not give us the connection, but we judge the connection on the basis of the system demanded by the observation, and this systematic or reasoned judgment is the essence of proof".

3. The Paradox of Inference

There are two features viz., necessity and novelty in inference. The conclusion must necessarily flow

from the premises; and the conclusion must also be novel i.e., an addition to our existing knowledge. In a word the conclusion must be at once within the premises and outside the premises. This is called the *paradox of inference.*

Superficially speaking necessity and novelty seem to be incompatible. It is something like saying that A is within B and outside B. In fact, this paradoxical aspect vanishes after a critical examination. These two features are not inconsistent as they appear to be. Syllogistic conclusion can both be novel and necessary. Its necessity is obvious, for conclusion logically or inevitably follows from the premises. The conclusion also is novel since the major premise is not merely an 'aggregate of particulars'. Novelty does not signify something that is unconnected with the premises. It consists in making explicit in the conclusion what is implicit in the premises. There is both the element of novelty and necessity in induction. The novelty of induction is indisputable. Its necessity consists in scientific analysis of content. So long as we presume a connection it is novelty and when we try to demonstrate the connection with reference to facts it is necessity. Hence we conclude that really there is no paradox in inferential process.

4. Mill's Criticism of Syllogism

J. S. Mill denies the validity of syllogistic inference. According to him, the most important feature of inference is that it must lead to a novel conclusion. He says that there is no element of novelty in a syllogism. In a syllogism like the following, there is no inference at all.

All men are fallible
John is a man
∴ John is fallible.

The conclusion is already contained in the major premise. We are not entitled to make the general assertion unless we already know that John is fallible. Hence the conclusion, being already assumed in the general proposition cannot be proved by it and if the major premise is regarded as the real ground or the proof of the conclusion, then the syllogism commits the fallacy of *petitio principii.* Mill says " It must be granted that in every syllogism considered as an argument to prove the conclusion, there is a *petitio principii,*.........that no reasoning from general to particulars can, as such prove anything. Since from a general principle we cannot infer any particulars, but those which the principle itself assumes as known". Further he says 'The inference is finished when we have asserted that all men are mortal. What remains to be performed afterwards is mere deciphering our own notes'. To syllogise, in a word, is not to infer, but 'to decipher and interpret'.

Thus Mill accuses the syllogism of the fallacy of *petitio principii.* He denies the validity of its process and adds that real inference is from particular to particular.

Criticism

Mill denies the validity of the syllogism because he misunderstands the function of the universal in a syllogism. According to him, a universal is a mere summation of observed instances. If all the particulars have been examined then the syllogism is useless. But in fact, the universal is more than a mere summation of observed instances. It is not an 'aggregate of particulars'. It is not a collective judgment. It only asserts a connection of attributes and hence it is fundamentally hypothetical. 'New'

knowledge does not mean knowledge unconnected with the premises but knowledge not in our possession. Its novelty consists in bringing to consciousness what is implicit in the universal. But logic cannot be expected to do more than this. It can only enable us to know what was previously existent in some form. The necessity of the minor clearly reveals the novelty of the conclusion. In a syllogism of the following kind there is no inference.

All the books in my shelf are logic books
This is a book in my shelf
∴ This is a logic book.

Hence there is a show of proof Really there is no inference at all because so-called major premise is a collective statement. The truth of the conclusion is already contained in the major since all the bookc are already found to be logic books.

But in a syllogism thus is not the case. The universal asserts a connection of attributes. Hence we conclude that syllogism is strictly limited form of inference, but within its own limits it is quite valid.

CHAPTER VII.

INFERENCE (*continued*).

Mill's Theory of Inference

Mill says "All inference is from particular to particular. General propositions are merely registers of such inference already made, and short formulae for making more.........The universal type of reasoning is resolvable in all cases into the following elements: Certain individuals have a given attribute, an individual or individuals resemble the former in certain other attribute; therefore they resemble them also in the given attribute." Further he adds "Not only we may reason from particular to particular, without passing though the general, but we perpetually do so reason.........The child who having burnt its fingers, avoids thrusting them again into the fire, has reasoned or inferred, though he never thought of the general maxim, fire burns.........He is not generalising; he is inferring a particular from particular.........It is not only the village matron who, when called to a consultation on the case of a neighbour's child, pronounces on the evil and its remedy on the recollection and authority of what she accounts for the similar case of her Lucy" He says that we argue from parallel or similar cases. According to him inference is neither from particular to universal nor from universal to particular but from particular to particular. He contends then, that

inference proceeds from particular to particular without the intervention of a universal.

Criticism

Mill's view of inference as a process from particulars to particulars is the direct outcome of the empirical theory of knowledge, of which he is an ardent exponent. According to empiricism all our knowledge is entirely based upon experience and mind does not contribute anything in the development of knowledge.

What justifies us in passing from one particular to another? It is the resemblance of the two cases—certain qualities which the two cases have in common. We cannot reason validly even from any particular case to any other resembling or parallel case. The child who shuns the fire implicitly argues from a universal. There is inference from one instance to another similar instance, not because of mere particulars, but because *they are instances* of a universal.

Even in a single instance mind is active. It begins to universalise or generalise the connection. The universal connection is implicit in the very thought of the particular. When the mind extends this particular instance to another case, it brings a new instance under the implicit general law. It is in principle a syllogistic argument, bringing a new case under a general principle. To say that inference is from particular to particular is to ignore the mental activity.

In the strictest formal sense, there can be no inference from particulars to particulars. I say, John is mortal, James is mortal, therefore Henry is mortal. When there is such an inference, it is merely

that the ground of inference is not mentioned. It is not these particular facts as mere particulars that justify the inference to other facts, but the assumption that these particulars are instances of a universal law of necessary connection between the attributes of humanity and mortality. The reason, therefore, for the belief that Henry will die, is that he possesses those attributes which are universally connected with mortality. To say that inference proceeds on particulars is to overlook the intellectual work.

If the terms are really particulars, as, X is a, Y is b. *Z* is c, one is helpless ; they do not point to anything further at all; there is no bridge from one to another. As Bosanquet says "Inference cannot possibly take place except through the medium of an identity or universal which acts as a bridge from one case or relation to another."

The Relation between Induction and Deduction

Generally it is said that deduction starts from the universal and reaches the particular, and induction starts from the particular and reaches the universal. We may start with some general principle which we already know and try to show that some result necessarily follows from it. Thus from the relative positions and revolutions of heavenly bodies, astronomical reasoning might lead to the conclusion that an eclipse will take place at a particular time. This method of reasoning is called *deduction*. In *induction*, on the contrary we observe a number of particular facts and try to discover a general principle. Thus from the observation of falling bodies, we infer that all bodies gravitate.

But these two processes are not clear-cut and separate. In fact one depends on the other; one supplements the other. It is clear that deduction requires a universal; without the universal there can be no conclusion. We know that the universal is obtained by induction. Hence deduction presupposes induction. Similarly induction depends on deduction. Induction is a complex process involving observation, hypothesis, verification and generalisation. First we observe a number of facts; then we formulate a hypothesis to explain their behaviour. We then deduce certain consequences from the hypothesis and find whether they tally with the existing facts or not. If the inferred consequences agree with the facts, then it becomes a generalisation.

In both the cases, it is the universal connection that gives us the inference. The difference between the two is only the *starting-point*. If we start with a law, and show that a given instance is an example of it, it is *deduction*. But if we start with the particular facts and trace a general law out of them, then it is *induction*. Hence both deduction and induction are not two kinds of inference, but two aspects of the same process.

In both the cases of inference there is an insight into a general law. In an act of inference we are always building up a system. In either case, it is the apprehension of the manner in which the particular facts are connected together into a system or whole. Inference always implies an effort on the part of the mind to see how phenomena are necessarily connected according to some general principle. 'The inference is a necessary implication of the system and the laws according to which it operates.' In other words, inference always implies a systematic connection of things. And without the apprehension

of this connection; there can be no inference. Inference is based on systematic knowledge.

Mill's Methods as Weapons of Elimination

The principle involved in all these methods is that of elimination. The nature of causality is such that where cause is present, the effect follows; where it is absent, the effect is absent; wherever it varies, the effect varies, and their variations are proportional; and what is the cause of one is not the cause of a different thing. All these methods eliminate the irrelevant and variable antecedents which fail to satisfy the requirements of causality.

In the Method of Agreement, the variable antecedents of a phenomenon are eliminated, for nothing is the cause of a phenomenon in whose absence the event occurs. In the Method of Difference elimination is effected by an experiment. By means of an experiment the suspected cause can be eliminated and then we find what changes happen in its absence. Thus we eliminate the irrelevant antecedent by means of an experiment. The Joint Method is only a double employment of the Method of Agreement and the Method of Difference. In the method of Concomitant Variations, the cause and effect are partially eliminated. Two events are connected causally, if the partial elimination of the one involves the partial elimination of the other. Even in the Method of Residues we eliminate the amount of known effects from a complex one and then seek the cause of the residue. Thus we see all the methods proceed on the *principle* of elimination.

The principle of elimination is formal in character. The difficult part of the work of the scientist consists

in observation and careful analysis of a given phenomenon. Very often, he has to isolate the suspected cause or the surrounding details. His work requires not only exact instruments but also repeated and careful experiment. The Mill's methods take for granted that this work has been completed. The certainty or uncertainty depends upon this preliminary investigation and not upon the application of the method. The degree of the certainty of the conclusion arrived at by the methods is determined by the degree to which what they take for granted has been done. Hence we conclude that Mill's methods are weapons of elimination only in principle.

Mill's Methods as methods of both Discovery and Proof

In discovery we find out a new thing. Discovery adds a new element to the existing knowledge. By proof we mean the logical necessity. To prove a statement is to show the grounds upon which it rests. Now the question is whether Mill's Methods are methods of discovery or methods of proof. In other words, is inductive generalisation both novel and necessary?

Inductive methods are both the methods of discovery as well as proof. In as much as we presume a connection, it is guess-work or discovery. In so far as you analyse the connection, it is demonstration or proof. For in logic discovery cannot be treated apart from proof. There are both the elements of necessity and novelty in inductive procedure. Guess-work is guess-work unless it is shown to follow necessarily from the systematic nature of facts. Hence we conclude that Mill's Methods are both the methods of discovery and proof.

Inference is both Analytic and Synthetic

The words 'analytic' and 'synthetic' are used in modern logic in a unique sense. Synthesis and analysis refer to the identity and difference in a judgment. The same thing can be expressed thus: a judgment is both analytic and synthetic. Identity refers to the universal element in thinking whereas difference refers to particulars. We have seen already that these features hold good of judgment. Inference is only an expanded judgment; hence it must be also both analytic and synthetic.

Inference is a whole consisting of parts. Synthesis refers to the whole and analysis refers to the parts. It is an identity in difference. Inference, then, is not a transition from one mental state to another; it not a mere association of ideas. It is the content of *one idea* though we can distinguish different parts; it is a synthesis of distinguishable elements. Inference requires both analysis and synthesis, both necessary connection and advance, both identity and difference between the premises and conclusion.

Take the case of deduction. It is both analytic and synthetic. The syllogism as a whole is a complex mental activity; it consists of whole and parts. We infer the parts from the whole.

All crystals are solids,

Salt is a crystal,

∴ Salt is a solid.

In the above syllogism there are parts like crystals, and solids and salt. But these parts are connected by a universal. There is a common thread or element running through these notions, which furnishes the principle of connection. There is an

identity pervading through the difference. The particular is implicit in the premises and becomes explicit in the conclusion; in a word we go from the whole to parts. There can be no inference without the medium of an identity or universal. The universal links the particulars. We cannot infer anything from the statements that 'logic is a science' and 'sugar is sweet', for there is no common element found between them.

Take the case of induction. It is also both analytic and synthetic. In this case we build a whole out of parts. We examine a number of instances and then generalise e.g., John dies, Charles dies, Henry dies, therefore we conclude that all men die. The universal element which is implicit in the particular becomes explicit in the conclusion. There is an identity running through different elements. Without the identical or universal element there can be no inference. Really we cannot go from mere particulars to particulars. From mere difference, from mere parts there can be no inference.

From mere particulars there can be no inference, for example, we cannot have any inference from statements like x is a, y is b and z is c. When I say Henry dies, James dies, therefore George will die, the conclusion is based on the universal connection between humanity and mortality. It is because of this universal or identity that we can infer that George will die. Induction always implies a universal or systematic connection between two facts; without this pervading identity the particulars will not be linked together. A whole is synthesis of distinguishable parts; the parts always imply a whole.

The universal element is like a thread which unites the beads. Further inductive reasoning is a

continuous process; there is no mechanical jump from the particular to universal. The continuity of thought involves some identical element, without this identical element sucessive steps will not be pieced or related together.

We conclude, therefore, that inference is both analytic and synthetic. We have seen that this is true of both deduction and induction. Inference always builds a system. It is a whole consisting of parts. In deduction we go from the whole to the part, universal to the particular; but in induction from the part to whole, particular to universal. When whole is explicit and parts implicit, we have deduction; but when whole is implicit and parts explicit then we have induction.

Judgment and Inference

We have applied the law of evolution to thought-process. It becomes at once evident that thought is a developing process. Thought also develops in accordance with the general law of organic evolution. As thinking develops from the form of simple judgment to inference, it shows progressive differentiation and integration. Judgment and inference appear as stages in one intellectual development. The complex intellectual processes have grown out of simpler ones. Inference is more complex than judgment. Judgment can scarcely be said to have parts. In a word, it is homogeneous. It corresponds to an amœba in biology. It is the most primitive type of thinking. It is an indivisible act of thought. But inference is more developed; it corresponds to a highly developed organism like a dog. In it we have different parts; in a word it is heterogeneous. It has different parts like premises and conclusion. There is more of

differentiation and integration. It is a completely articulated form of judgment; it is an expanded judgment. In the evolution of knowledge inference marks a higher level than judgment. An advance in knowledge implies at once new facts and distinctions, and also the perception of new connections and relations among facts. Thus we see the development of thinking involves a continuous increase in both differentiation and integration. Knowledge at the highest is a system; in it we find the maximum of analysis and synthesis, differentiation and integration.

Further inference differs from judgment in exhibiting the grounds upon which it rests. Judgment is only a brutal assertion. It merely states a fact. But an inference is a reasoned judgment. It is conscious of the grounds. In the development of knowledge, the judgment expands showing the reasons which it necessarily presupposes. Moreover the necesssity of a judgment is immediate, like that of a colour-match. But in inference it is mediate; it depends upon the premises. Judgment merely asserts a fact. It only interprets a sensory impression; it only narrates an historical fact. But inference is an insight into the necessary connection of things. It implies the systematic connection of facts.

Thus we see that judgment develops into inference according to the law of evolution. Hence we conclude that passage from judgment to inference illustrates the law of evolution.

Conception, Judgment and Reasoning

We have applied the law of evolution to thought-process and found that development in thinking involves more of differentiation and integration

Thought follows the law of organic evolution. However there is another fact implied in the very nature of evolution. It is found that all the essential functions of the fully developed organism are discharged by the primitive cell. In other words, the features of a cell are also found in a more developed organism. The cell and a more developed organism do not differ in kind, but only in *degree of complexity*. The characteristics of the amœba are movement, reproduction, assimilation, growth etc. Even in a highly evolved organism like a cat, these features are present. What is true of the primitive cell is generally true of animal as such.

The application of the evolutionary method to thought also brings out that judgment and inference are fundamentally same. They are not different in kind but only in degree. Judgment is necessary, universal, constructive and analytic and synthetic. It is evident that these features are also found in inference.

Judgment is necessary; inference is also necessary. But the necessity of judgment is *immediate*, whereas that of inference is *mediate*. In inference, necessity depends upon the premises. Judgment is also universal in the sense that any intellectual being would make the same judgment. Inference is also universal in as much as the conclusion is not only true for me but also for all. Given the same materials, anybody must have the same conclusion. Judgment is constructive. Inference is also constructive. Inference is an insight into the systematic knowledge. Judgment is both analytic and synthetic. It is an identity in difference. It involves connection and discrimination. Inference is also analytic and synthetic. It also connects facts into a whole. Both of them build systems. Judgment

is the content of one idea, though we may distinguish different elements within it. So also is inference; it is an intellectual process having different parts like premises and conclusion.

Jevons seems to commit a blunder in dividing knowledge into *simple apprehension, judgment* and *inference.* No doubt judgment and inference are fundamentally same. But according to Jevons these three activities are different kinds of intellectual processes. There is no such thing as simple apprehension. We are never aware of an idea. Judgment is always the starting-point in knowledge. The so-called simple apprehension must be a rudimentary judgment. It is equally false to say that concept is the starting-point in knowledge. We have already seen that judgment is the most simple and elementary act of thinking. Concepts are only embodiments of a number of judgments. Hence we conclude that judgment and inference are fundamentally of the same type.

"Inference is construction followed by intuition" (1933.)

EXPLANATION

This statement is Bradley's definition of inference. According to this view, inference is construction: the separate terms in the argument are unmodified in the conclusion, e.g.,

$$A=B$$

$$B=C$$

$$\therefore A=C$$

Here the conclusion is reached by intuition—by immediately perceiving them. This cannot be put into syllogistic form. It is a construction of series.

Certain elements are put together and at once the conclusion is evident. Construction is piecing together of asserted mental contents. As Bradley says, "An inference is always an ideal construction resulting in the perception of a new connection. So far as this perception of the conclusion is concerned, there is no possibility of laying down rules, and the syllogistic logic teaches a superstition." We take certain elements and construct them into a unity and then we perceive a fresh relation. Thus the process is a construction and the result is an intuition, while the union of both is a logical demonstration. We first do some work on our data; and this work is construction. We, then, by inspection discover and select a new relation and this intuition is conclusion.

Criticism

But this definition is wrong. The conclusion is not arrived at by intuition. Unless we discover the principle of connection, we cannot get any conclusion. For example, from the muddy condition of the roads, and the swollen streams we conclude that there had been rain; we cannot draw any such conclusion unless we know the *necessary* connection between rain and the muddy condition of roads. Further, if the conclusion is reached by intuition, why should there be a particular conclusion and not any other?. Even in the above example, there is the connecting link. It is possible to connect A and C, because A is identical with B, which in turn is identical with C. But for this connection, there can be no inference. We cannot get any conclusion from mere disconnected things like A=B and D=M. Inference is always a necessary implication of a system and the laws according to which it operates.

"Induction can be formally represented in a disjunctive syllogism with a hypothetical argument employed in the disproof of rejected alternatives."

EXPLANATION

The process of induction can be represented in the form of a disjunctive argument, where the conclusion is reached by eliminating successively all but one of the disjunctive members. Induction aims at finding causal connections; it discovers a necessary connection between two phenomena. It is evident that the principle of elimination is involved in the determination of causal connection. We eliminate or remove the irrelevant or accidental antecedents of a phenomenon. For nothing is the cause of a phenomenon in absence of which it occurs. Thus we see the *principle of elimination* is involved in induction; hence the inductive process can be represented in a disjunctive syllogism.

The cause of P is either A, or B, or C.

The facts prove that it is not A or B.

∴ C must be the cause of P.

To bring out the hypothetical element the argument can be elaborated thus:

The cause of P is either A or B or C.

If the cause is not C then, either A or B is the cause.

The facts prove that A & B are not causes.

∴ C is the cause of P.

This account of induction is fundamentally correct in principle. But this makes inductive process more formal than it really is. It is obvious at the beginning of inductive investigation, all the possibilities are not definitely and disjunctively enumerated. It is by a tedious process of observation and experiment that the scientist finds out the real causal connections. In other words, the scientist has to do a lot of preliminary work to formulate the various possibilities. In testing them he has to resort to experiment and observation. Further the conclusion is not merely the result of the process of exclusion. But really various hypotheses are formulated and tested with reference to facts.

But the disjunctive principle may be regarded as the working basis of inductive procedure. As a formal statement of the process, this account may be correct. But, in reality induction is not so formal as it is stated. It involves various stages like observation, hypothesis, verification and generalisation

Linear theory of Inference

Formal logicians consider that inference is a linear process, i.e., knowledge is a disconnected series of syllogisms. According to this view a syllogism is an individual and self-sufficient process of thought. In a syllogism the conclusion is reached as a result of the middle term. The middle term connects the major and minor, as a result of which there is the conclusion. Syllogism is the statement in a single judgment of what the two premises mean when taken together. It is essentially a process of *comparison*. Each of the terms entering into the conclusion is compared in turn with the same middle term, and in this way their relation to each other is determined. Then a syllogism is an ideal construction.

But this view of syllogism is wrong. Syllogistic inference is based on the systematic connection. It is, like all inference, an insight into the necessary connection of things. Without this systematic knowledge, there can be no syllogism. It is not a process of comparison but a necessary implication of a system and the laws according to which it operates. In a word, a syllogism always implies a system. Hence linear theory of inference is wrong.

Induction is the inverse process of Deduction

Jevons calls induction as the inverse process of deduction. In deduction we are given the premises and we then find the conclusion, whereas in induction we are given the conclusion and then we proceed to find the premises. Therefore Jevons calls deduction as the direct process and induction as the inverse process.

This way of stating the relation between deduction and induction is apt to suggest that there are two kinds of reasoning which are independent of each other. But it must be remembered that the real process of inference is the same in both cases. The essence of inference consists in showing the manner in which the particular facts are connected together into a system or whole. Inference is an insight into the necessary connection of things. The difference between deduction and induction is one of *starting-point* and not of principle. If we start with a law and go to its consequences, it is deduction. If we start with facts and go to a law, then it is induction. Hence we conclude that deduction and induction are not two separate processes but two different aspects of the same process.

EXERCISE. VI.

1. In the development of our knowledge, which usually comes first, premises or conclusion?

2. What is meant by 'necessity' and 'novelty'? Are they incompatible?

3. What are the essential features of inference? Show how they are present both in deduction and induction.

4. Criticise the view that inference is from particular to particular.

5. 'All inference is both analytic and synthetic.' Explain.

6. 'Syllogism commits the fallacy of *petitio principii*' Discuss.

7. Determine the nature of scientific universal, and discuss the bearing of your view on Mill's criticism of syllogism.

8. Show how far conception, judgment and reasoning are fundamentally of the same type.

9. How does inference differ from judgment? In what sense may it be said that it is an extension of the latter process?

10. Does the passage from judgment to inference illustrate the general law of logical evolution? Explain.

11. What is meant by the '*paradox of inference*'?

12. 'Inference is a construction followed by intuition.' Explain and discuss.

13. Argue in general terms whether Mill's methods are *weapons of elimination*.

14. Speaking of induction, it is generally held that formally the reasoning involved is just that a disjunctive argument with a hypothetical argument employed in

the disproof of rejected alternatives. Do you agree with this view?

15. 'Induction is the inverse process of deduction' Discuss.

16. Would the doctrine that in knowing we first have simple apprehension, then as separate intellectual processes, judgment and finally inference, agree with the general evolutionary view of consciousness? Explain fully.

17. Explain how Mill's methods are both the methods of discovery and proof.

18. 'Inference is the necessary implication of a system and the laws according to which it operates'. Discuss.

19. 'System is the ultimate condition of inference'. Explain.

20. Bring out what is contained in the notion of valid inference. What is the correct way of stating the relation between deduction and induction? (1933).

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CHAPTER VIII

SCIENCE AND PHILOSOPHY.

We have applied the mothod of evolution to thought-process. Thinking is a dynamic process by which knowledge is built up. The development of knowledge means a continuous increase in both differentiation and integration. In an amœba we have no differentiation and integration. But in the most developed organism there will be the maximum of differentiation and integration.

In the same way, our common-sense knowledge lacks system and discrimination. But the ideal of knowledge is a systematised and unified whole. In it different facts are arranged, related, and systematised. It is a systematic whole where each fact has its place and bearing upon other facts. Then, the ideal of knowledge is to reduce the mass of facts with which it deals to an orderly and intelligible system. Thought from its beginning constructs the system of knowledge. The very nature of thought is to form the real word into a connected system.

The fundamental characteristic of thought is discrimination and connection. This work of thought is achieved by every-day thinking, science and philosophy. It is evident that very much of our

ordinary thinking is slip-shod and unsystematic. In science we find more of systematisation of facts. In it we find in a greater degree the unification of knowledge. But, it is only in philosophy that we find the complete unity of knowledge.

Thus we see science and philosophy differ only in degree and extent of unification of knowledge. What is a science? A science is a systematic and exact body of knowledge dealing with a particular subject-matter. In the world we have different things like, plants, trees, rocks, planets, stars etc. Each science takes a particular portion of reality and studies it. Thus, for example, astronomy deals with heavenly bodies, like stars and planets, botany with plants and zoology with animals. Thus we see that every science deals only with a fragment of knowledge. The problem of philosophy is to unify knowledge obtained by different sciences. 'The work that philosophy is called upon to undertake is to interpret these results in such a way as to render them coherent and thinkable'. It correlates the results of different sciences. It takes all the results of sciences and then systematises them into a coherent whole. In other words, a science takes a part of knowledge, and systematises it, whereas philosophy takes the whole of knowledge and systematises them. As Herbert Spencer says 'Knowledge of the lowest kind is un-unified knowledge; science is partially-unified knowledge; philosophy is completely-unified knowledge.'

The passage from science to philosophy illustrates the law of organic evolution. Knowledge in its beginnings is fragmentary. It lacks distinctions and connections. In a word, it has no differentiation and integration in it.

But in science we find more of differentiation and integration. The scientist not only makes a number of distinctions but also relates them in an orderly way. For example, an ordinary mind does not analyse the parts of a flower; but a botanist can distinguish different parts in it like pistil, stamen, anthers, petals, sepals etc. Further his knowledge of plants is also systematic. He will bring a number of botanical facts under certain general principles.

But even the knowledge of the scientist is partial and limited. He deals with a small portion of reality. Philosophy aims at the complete unification of knowledge. In it we find knowledge in its fully-developed state. Philosophy differs from science in the extent and degree of unification of knowledge. From categorical to hypothetical, and from hypothetical to disjunction there is a continuous development of knowledge. From history to science and from science to philosophy, there is a gradual increase in both differentiation and integration.

Explain the relation between science and philosophy and apply the distinction to the relation of logic and other sciences (1933).

Ans.

Science deals with a particular portion of reality whereas philosophy deals with the whole of reality. Thus we see botany deals with plants and geology with the earth's crust. Science systematises knowledge and philosophy also systematises knowledge: the difference is only the extent of knowledge which they systematise. Further philosophy depends upon sciences. Various sciences deal with various

aspects of experience. At first it may appear as though there is no subject-matter for philosophy. But philosophy, unlike science, takes the totality of knowledge and systematises it. It takes the results of various sciences and unifies them into a coherent and thinkable whole. The problem of philosophy is to achieve a more complete unity of knowledge than that realised by various sciences.

The relation between science and philosophy is similar to that of logic and other sciences. Logic is the science of thinking. Since thinking is made use of in every branch of knowledge, logic is generally called as the science of sciences. Since there can be no thinking *in vacuo*, any bit of thinking must be some scientific knowledge. Hence it appears as though there is no subject-matter for logic. Really logic does not deal with stones or gases or plants but with the general principles of thinking. In logic we study the types of thinking, without any reference to actual concrete facts thought about. In short, logic deals with the form and not with matter of thought.

Philosophy studies all the facts to *systematise* them into a coherent whole. But logic studies the scientific facts to discover universal principles in thinking. Philosophy is *material* in content; whereas logic is *formal* in content. Both of them deal with sciences; but the stand-point of the two differ fundamentally; one studies the results of sciences to *unify* them, the other studies them to *discover the forms of thinking*. Although both of them depend upon sciences, they differ in methods. Philosophy must take cognisance of sciences in formulating its problems; logic also must take cognisance of sciences in studying the rules or laws of thinking; the former deals with the *culmination of thinking activity*

whereas the latter with the *methods and processes of thinking activity*. The relation between science and philosophy is *material* whereas the relation between logic and other sciences is *formal*. Hence we conclude that the relation between science and philosophy is superficially similar to that of logic and other sciences.

EXERCISE VII.

1. Explain briefly the law of evolution as applied to thought, with special reference to the relation between science and philosophy (1932).

2. Explain the relation between science and philosophy, and apply the distinction to the relation of logic and other sciences (1933).

3. Does the passage from science to philosophy illustrate the law of evolution?

4. Discuss the validity of the recognition of three stages of knowledge: common-sense, science and philosophy.

CHAPTER IX.

BOSANQUET'S THEORY OF KNOWLEDGE.

Theory of Knowledge and Metaphysics

Logic is the science of thought. It deals with the characteristics of knowledge. But theory of knowledge deals with the relation of mind to objects. In a word, it is concerned with the relation between knowledge and reality. The word 'reality' in logic means the world of things. Theory of knowledge deals with the nature of objects and nature of truth. Metaphysics deals with the ultimate nature of the universe; its problem is to find out whether the whole universe is a mere blind play of atoms or is guided by intelligence or purpose. It enquires into the nature of matter, mind, space, time, etc. Hence, theory of knowledge is only a branch of metaphysics.

There are two important theories of knowledge: Idealism and Realism. According to Idealism all things in the world are ideas in our mind. They are internal and subjective; they exist in the mind. According to Realism the things are outside the mind.

Bosanquet's theory of knowledge is called objective idealism. He identifies logic with theory of knowledge. Bosanquet states the problem thus: Psychology deals with ideas, feelings, dreams, etc. It is concerned with their interconnection and mode

of existence. Then the problem of logic is: How does the course of my private ideas and feelings contain in it, for me, a world of things and persons *which are not merely in my mind?* In other words, how does the reality is identical for all, though it exists in our minds?

Defects of Subjective Idealism and Realism

Bosanquet starts with the theory of *Subjective Idealism.* It states that the world is an idea. What is an apple? If we taste it, it is sweet, if we touch it, it is hard; if we see it, it is spherical; and if we smell it, it gives a fine odour. Hence an apple is nothing but a bundle of sensations or ideas. Apart from the sensations, what is that? It is nothing. Hence it exists in the mind like that of dream or a sensation of pain. The whole world is only an object in relation to a subject, perception of a perceiver. All objects exist in our minds; they are merely states of our consciousness.

But according to common sense, things are outside the mind; they are independent of our consciousness; they exist in their own right, whether we perceive them or not. According to the common-sense theory formulated by Locke and Reid, things are outside the mind and the ideas are inside the mind. In other words, there are two kinds of worlds; one inside the mind and the other outside the mind and ideas of external things exist in mind. According to Realism, as the theory is also called, the ideas copy the external objects like the images in a mirror. But Locke makes a distinction between the primary ideas and secondary ideas. The primary ideas are those that exist in the object itself, like extension, solidity etc. The secondary ideas are

those that exist only in the mind like, colour, sound, smell, etc.

But this view is wrong. If the object is outside the mind, how do we know that idea is the true copy of the object outside, for outside is outside and inside is inside. By our hypothesis we know only our ideas, if so, the objects which are outside the mind are beyond our reach. In a word, they become purely subjective, for whatever has passed through the mind are only mental. Then, the natural conclusion of this theory will be solipsism and agnosticism. Bosanquet calls this as an absolute *cul-de-sac*. In short, this amounts to a denial of knowledge.

In theory of knowledge the words 'subject' and 'object' have special meaning. The subject refers to the mind which perceives the things and the object refers to the external things that are perceived. According to Realism the subject is different from the object; mind is different from matter. But idealism identifies subject with object, mind with matter.

There are equally fatal objections to Subjective Idealism. It states that all the things in the world are ideas in the mind. Naturally what is true of the mind becomes true of knowledge. Instead of avoiding the defects of Realism, it runs deeper into the *cul-de-sac*'. But this theory is not without its merits. It is really an improvement over that of the Common-sense theory. Realism merely tells that the ideas in the mind copy the outside objects in a mechanical and ready-made way. The value of Subjective Idealism consists in pointing out that knowledge is not a passive reception of ideas or copying the outside objects in the mind.

The Philosophical Theory

Bosanquet propounds his theory of knowledge by avoiding the defects of the above two theories. He agrees with Subjective Idealism in asserting that the things are inside the mind. He also agrees with Realism that the things are objective, in the sense they are not merely *my states of consciousness.* That is why his theory is called *Objective Idealism.* The defect of Subjective Idealism is that it states that reality is in *my* mind. But ideas may be inside the mind though they may refer to something that is not purely in consciousness. As Bosanquet says 'we must distinguish between the idea that objective is outside the consciousness and therefore not in consciousness and the idea that the objective can be in the individual consciousness but identified with something beyond the individual consciousness'. Ideas may refer to some identical thing though they have their being in the mind.

We must draw a distinction between the idea in the logical sense and the idea in the psychological sense. Ideas in the psychological aspect are momentary and fleeting. They are evanescent. They are unsteady and dynamic. Every minute, every second they differ; they are particular perishing existences. If ten people see a building, each person will have a unique succession of images, different people will have different images of the building. The images are fleeting like that of a kaleidoscope. Though they are shifting and changing yet they refer to an identical object. To take another illustration. An artist, a farmer, a botanist and a geologist see a hill side in an evening. Each will describe the scenery in his own individual

way. Further each one of them will have different series of images of the hill side. But all these different arrays of images refer to the self same hill side. Bosanquet calls this as an idea in the logical sense. Idea in the logical sense is an identical reference and idea in the psychological sense is a mere presentation. Amidst the changing ideas, there is something that is permanent. The idea in the logical sense does not consist of, but is contained in these fleeting sensory impressions. It is trans-subjective and self-transitive; it is an extra-mental reality. It is objective in the sense that it is identical for one and all ; 'objective' does not mean corporealness or materialness.

Why should we draw a distinction between the logical and psychological aspects of an idea? If we do not draw any such distinction, we fall into the defect of Subjective Idealism. It ascribes to the word of knowledge all those properties which are *only* true of an individual mind. But according to Objective Idealism, knowledge is within consciousness, though it may refer outside it. Objective means what we are obliged to think. The world constructed by thought is something more than mere sensory impressions. According to the philosophical theory the objective is independent of consciousness in the sense that it is what we are constrained to think.

Thus each one of us construct a world for himself. Each person is shut up within his own encircling ideas, like a man in a circular panorama. Each one will know only his own ideas and images. Then, how do we know that all the individual worlds are same? The answer is that they *correspond*. They correspond like the drawings drawn in different

perspectives. The different worlds are like different photographs of the same building taken in different angles. Realists use the word 'correspondence' in a different sense. By correspondence they mean the likeness or similarity between the ideas in the mind and the things outside. Now the problem of logic is how these worlds are constructed. Since reality is mental, knowledge is identical with reality. And logic becomes the mental construction of reality.

CRITICISM.

Bosanquet identifies logic with the theory of knowledge. According to him logic deals with the mental construction of reality. The function of thought is to construct the world of knowledge. But if we want a fabric, we must have thread to weave and the tools to weave with. The thread is the world of sense and tools the activity of thought. But Bosanquet says that knowledge is *purely a mental construction.* This is impossible. Without sense data, no knowledge can be constructed.

"'Knowledge is within consciousness though it may *refer* outside it."

EXPLANATION

According to Subjective Idealism, knowledge exists only in consciousness. In other words, objects are ideas in an individual mind. But objective Idealism states that knowledge is not merely in *my* consciousness. Bosanquet agrees with Subjective Idealism in asserting that knowledge is in the mind. But he does not stop with that; he says that knowledge is something that is identical for all. Here he draws a distinction between an idea in the psychological and idea in the logical sense. An idea in the psychological sense is a mere presentation. It is a fleeting

sensory impression. But an idea in the logical is an identical reference. It is objective in the sense that it is same for one and all. *Knowledge does not merely consist of mental states, but is contained in them.* The defect of Subjective Idealism is that it ascribes to the world of knowledge those features that are only true of an individual mind.

Knowledge is, of course, mental. But it is also objective since knowledge refers to a permanent reality which is true to one and all. In short, there is no dualism between subject and object, but only a duality between them,

"The world is a system of things and persons connected together, taken to be the same for oneself at different times and for different minds at the same time, yet existing for one self, in the medium of one's individual consciousness."

EXPLANATION

This is what is meant by saying that knowledge exists in mind though it may refer outside it. Knowledge is a systematically connected whole. The world of knowledge not only includes things but also individuals. Bosanquet's theory is one with Subjective Idealism in stating that knowledge is mental. But the defect of the latter is that it does not distinguish logical and psychological factors in knowledge. Knowledge is neither purely psychical nor logical; it partakes of the both. Bosanquet's merit consists in weaning knowledge from mere psychological level. Knowledge is objective; it is identical for all. Objective does not signify physical tangibility or corporeality. It is evident that knowledge is mental. But it is equally true that knowledge contains identical element and that identical element is the permanent reality. In other

words, knowledge is in *my* mind, *though it is not only in my mind.* The world of knowledge is something permanent and steady though existing in our consciousness. It is not one thing to-day and another to-morrow. It is also identical for a number of persons at a particular time. In other words it is a permanent reality.

"In knowledge there is no passage from subjective to objective, but only a development of the objective."

EXPLANATION.

According to Realism the objects are outside the mind and the ideas are inside the mind. There is an unbridgeable gulf between mental and physical realms. If the objects are outside the mind, how do we know that ideas in the mind exactly copy them? Hence Bosanquet adopts the subjective stand-point to avoid this defect. Ideas, then are inside the mind. How do we know that they represent a permanent reality. For we know what is only in the mind.

Knowledge is objective; it is what we are obliged to think. The work of thought is to build a system of knowledge. Since Idealism sates that reality is mental, it easily identifies knowledge with reality. But Subjective Idealism commits the mistake of ascribing purely sensory impressions to knowledge. In a word, it makes knowledge purely subjective. But Objective Idealism draws a distinction between purely logical and psychical aspects of thought; accordingly knowledge is a development of objective reality. It is a permanent reality not depending upon the mind, though existing in it. In knowledge, we do not copy an external reality in the mind. Ideas do not pass from external objects to the mind.

EXERCISE VIII.

1. What is the 'fake turn' taken by the common sense theory in its attempt to solve the problem of knowledge? (1933).

2. If the world is the product of the constructive activity of our individual minds, how can we speak of one Real world, or of truth as being objective? (1933).

3. What are the defects of Subjective Idealism? Does Bosanquet's theory escape them? If so, how? (1927).

4. State and criticise the common-sense theory.

5. 'Now this is an absolute *cul-de-sac*......... This is the pass to which we are brought by taking common-sense as the guide of theory and not as its material' At what point is the wrong turning taken? Indicate the approach to a more fruitful theory (1932).

6. What is the problem of logic as theory of knowledge? How do you distinguish it from that of metaphysics? (1928.).

7. "Our knowledge is within consciousness though it may refer outside it." Explain the statement so as to bring out Bosanquet's view of the relation of thought and reality.

8. What does Bosanquet mean by speaking of the world as Idea? (1930).

9. Show that there is in logic no passage from the subjective to the objective but only a development of the objective. (1931).

10. "The whole world, for each of us, is our course of consciousness, in so far as this is regarded as a system of objects which we are obliged to think": Elucidate. (1932).

11. What is the Bosanquet's view of the relation of subject and object in knowledge? How does it differ from that of Subjective Idealism? (1932).

12. What is meant by correspondence? How does Bosanquet use the term?

13. "The world is a system of things and persons connected together taken to be the same for oneself, at different times and for the different minds at the same time, yet existing for oneself, in the medium of one's individual consciousness." Explain.

14. Explain Bosanquet's theory of the relation of subject and object in knowledge and compare it with the relation between the two according to common-sense theory.

15. Distinguish between (a) idea as psychical presentation and (b) idea as identical reference (1933).

CHAPTER X.

BOSANQUET'S THEORY OF JUDGMENT

We have seen that knowledge is a mental construction. Since reality is mental, knowledge becomes identical with it. It exists as a series of judgments. Hence judgment is an affirmation about reality; in a word it refers to the world of objects. The essence of judgment consists in asserting something about reality. The subject in a judgment refers to reality and the predicate is an idea affirmed of it. The copula asserts the identity between the two; in other words judgment asserts a meaning and identifies it with something in reality. Bosanquet defines the judgment 'as the reference of a significant idea to a subject in reality, by means of an identity of content between them'. The subject of a judgment is an object or a thing in reality. The identity of content may be explained by an example. In the judgment 'This is a horse,' we have before our mind in perception something given, and we already know what a horse means, therefore we attach the word 'horse'. to it as a predicate because it is identical with the given perception in certain features. To take Bosanquet's own example, 'The table is made of oak.'........The table is given in perception........among its quality it has a certain grain and colour in the wood. I know the colour and the grain of the oak-wood and if they are the same as those of the table, then the meaning of the content 'made of oak' coalesces with this point in reality; and I am able to say 'This table is made of oak-wood.'

Thus in a judgment the given element in reality is qualified by an idea. It is an attachment of a significant idea to a subject in reality. When I say 'This is bread,' I attach or qualify the sense-perception by the meaning of bread to it. In all judgments, the given is interpreted, amplified or enlarged. Judgment is always an attachment of an idea to reality. As Bosanquet says 'judgment always appears as a revelation of something which is in reality'. It is not an idea in mind copying an external object. When I say 'This is white', I am stating the meaning of the idea 'white' has an identity with the object to which I refer. If there is no such identity of content anything can be asserted of a given reality.

All ideas cannot claim truth; we must always make a distinction between an idea as a pure sensory impression and an idea having some identical reference. Every judgment is an example of an idea in the logical sense. The essence of judgment consists always in affirming of reality. A relative clause taken by itself or a mere jumble of words taken by itself is not judgment. As Bosanquet aptly remarks "We may merely entertain an idea or affirm it." A relative clause taken by itself is an example of entertaining an idea. 'The university which abolishes philosophy,' is not a judgment inasmuch as we merely entertain an idea but not affirm anything of it.

Criticism

Bosanquet defines judgment as the reference of a significant idea to a subject in reality by means of an identity of content. This sounds very much like Realism. It suggests as though that the object'

is outside the mind and the mind merely knows it. Further he says judgment interprets the given datum. This is perilously near Realism.

"Judgment is an affirmation in which our present perception is amplified by an ideal interpretation which is identified with it."

EXPLANATION.

The statement expresses the nature of a judgment. In a judgment there is the given perception. When I say 'This is a dog' something is given in perception. We amplify or interpret it as dog. We know the meaning of a dog and we identify it with the given thing because it possesses the features of a dog. The phrase 'amplified by an ideal interpretation' means a significant idea. In other words, in a judgment we attach a significant idea to a subject in reality.

EXERCISE IX.

1. "Judgment is the reference of a significant idea to a subject in reality, by means of an identity of content between them." Elucidate with some examples.

2. Explain what is meant by saying that judgment is the mental construction of reality. (1933).

3. What is the distinction between entertaining ideas and affirming them? Explain in this connection the significance of the copula. (1929).

4. State and examine Bosanquet's definition of judgment, making clear the significance of the terms 'idea' and 'reality' employed therein. (1927).

CHAPTER XI.

THE CHARACTERISTICS OF JUDGMENT ACCORDING TO BOSANQUET.

Necessity

Judgment is necessary. This is what is meant by saying that knowledge is what we are obliged to think. The intellect is subject to compulsion when it judges. This is the difference between judging and day-dreaming. The necessity of judgment is revealed in such popular expressions like 'I am obliged to think' 'I cannot but believe' 'There is no alternative but to suppose'. Truth is something that is not a mere matter of taste. We cannot think what we can, but think what we must. Truth is objective; it necessarily flows from certain data. It is what we are forced or compelled to conclude.

Necessity is of two kinds: Mediate necessity and immediate necessity. The necessity of a judgment is *immediate.* In a judgment of mere sensuous comparison such as colour-match, the necessity is immediate. In inference or reasoning the necessity is *mediate.* It is mediated by certain premises. Its necessity depends upon the premises; the truth of the conclusion necessarily follows from the premises. Hence the difference between the necessity of judgment and that of inference is one of degree and not of kind.

Universality

Judgment is also universal. This is a necessary corollary of necessity. I not only know that my judgment is inevitable for me, but I never think of doubting that, given the same materials, it is obligatory for every other intelligent being. Every judgment is universal in the sense that any intelligent being would make the same judgment, given the same facts. Universality means something more. Judgment is not only obligatory upon every one given the same data, but it must also be *consistent* with the judgments of other persons.

Constructive

Judgment is constructive. It is always the interpretative activity of mind. If we hear some sound, we at once interpret it as the sound of a bus. The distinction between datum and interpretation is only *relative.* It is impossible to get at the datum pure and simple unqualified by judgment. Our knowledge is a mental construction. We shall indicate this by means of certain examples. Take the case of the perception of space. The perception of space involves various elements. What is only given in the sense-perception is difficult to determine. When I say 'This is a table'. The perception of the table as a solid extended object among the various things is due to the mental construction. It is the result of various sensations; all these cohere and give the perception of the table. The sensation of touch, the sensation of sight, and the sensation of motion are involved in the idea of table. All these sensations blend together and give us the solidity and extendedness of the object. The perception of the table is not given by the eye alone;

it is very difficult to imagine how the table will appear *only* to the eye. But the impossibility of getting at an original datum clearly shows that our knowledge is constructed by our judgments. To take another illustration. 'There is a bus', we hear some sound and interpret that there is a bus. The sensation of sound varies from time to time in loudness, roughness etc. Even here, it is impossible to get at the original datum. This clearly indicates how continuous and immediate our mental construction is. What is given in sense-perception is at once interpreted.

Judgment, then, is amplification, interpretation, enlargement, or construction. As Bosanquet says "judgment is pronouncing the interpretation of our perceptions to form one system with the data of our perceptions". Judgment always qualifies the given perception. In a judgment, we attach a significant idea to a given point in reality. In a judgment subject always refers to something given in reality and predicate is a significant idea and copula indicates the identity between the two. Bosanquet calls the idea as an ideal interpretation. This only means a logical idea. The 'ideal' has no reference to 'perfect'. If I say 'This is grass', I attach the idea 'grass' to the given perception because of certain identical features between the given perception and idea. The identical element is what Bosanquet calls as 'identity of content.'

Judgment is not merely an affirmation but a continuous affirmation of waking consciousness. If I say 'This rose is red', this implies the existence of a particular place where it is found and in turn the country, the continent and the whole of reality of which my present judgment is an element in it.

The meaning of my statement naturally drags on with it various things, till it finally refers to the whole of reality. The assertion shades off into innumerable facts, the reality of which is essential to make the judgment intelligible and true.

CRITICISM.

Bosanquet says that judgment interprets the given datum. This is perilously near Realism. He also thinks that space is purely a mental construction; but modern psychology says that spatial relations are outside the mind. Further it is hard to reconcile ourselves with Bosanquet's statement that judgment is a continuous affirmation of waking consciousness. The judgment 'This rose is red' does not imply the town where it is found, in turn the country, the continent, and the whole of reality. It does not go on continuously affirming the whole of reality. For to say that the whole system of knowledge is necessary for understanding an element in it is one thing; and to say that judgment continuously affirms the whole of reality is another thing.

"The whole world........is a single connected predicate affirmed as an enlargement of present perception."

EXPLANATION.

A judgment *qua* judgment has no meaning. It always exists as an element in the world of knowledge. When we make a judgment, only a portion of reality is in our attention; but its meaning naturally drags the whole of reality in which the particular judgment is an element.

When I say 'This tree is in Madras' this naturally implies the existence of the Madras Presidency, India, Asia, the world and the whole of reality of which the particular judgment forms a part. This is what Bosanquet calls as the continuous affirmation of the waking consciousness. A particular judgment goes on continuously expanding till it embraces the whole of reality.

The World of Thought and the World of Will Compared

Bosanquet compares the world of thought to the world of will. When we make a judgment only a part of reality is in the focus of our attention. In a judgment there are elements that are distinctly thought, that are dimly thought and that are implied. That is our assertion expands into a series of facts. And in our knowledge, at any time, the given is clear, much is dim, and much is implied and whole is a continuous affirmation. This can be likened to the expanding concentric circles.

This feature of thought can be compared to that of will. When we look at a picture, the purpose of looking at it shades off into the more general purpose of learning to take pleasure in what is good of its kind, which is again set in a certain place within the conception of our life. Thus we find in the world of will a similar case which illustrates the nature of our world of knowledge. There is the clear will to look at the picture, the dim will to continue standing and the implied will to carry out a certain general purpose. In the same way, even in thought there is what is distinctly thought, what is dimly thought and what is implied. Judgment is always the focal point of consciousness.

The Worlds of Man, Animal and Madman

Every sane man constructs the world for himself. It is an inter-related whole. The world of knowledge is objective; it is the same for every one who speaks of and refers to it.

The animal does not construct a world of knowledge for itself. A man though born blind constructs one for himself. But an animal moves and lives and does not seem to construct the facts of experience into a coherent and ordered whole. For the most part with the animals, out of sight is out of mind; the present is not interpreted or fitted into the rest of knowledge. It does not make any difference between purely sensory impression and the world of object.

A madman's world is *his* world constructed by him. His world is dominated by certain ideas. Suppose an ordinary man constructs a system of world where he makes himself as the king of England. He interprets and forms *a* world. In fact, he has broken away from the world and therefore we call him a madman, His world has no connection with objective reality.

The Difference between Waking and Dreaming

The difference between waking and dreaming is that in waking life we are always judging. In waking state we are aware of a reality which is not our purely subjective impressions but which is a permanent one. In dream, the judging activity of the mind is in abeyance. It is a mere sensuous presentation. There is a quick succession of images. A number of sensory impressions flit and pass. In dreams we do not find a connected and ordered system of reality.

EXERCISE X.

1. State and examine the properties of judgment (1931).

2. Explain and illustrate the general characteristics of judgment according to Bosanquet (1932).

3. Explain what is meant by saying that judgment is construdtive (1931).

4. Distinguish between the discernment of an animal, a man and a madman (1932).

5. Explain with suitable illustrations Bosanquet's view that our waking life is a continuous affirmation (1932).

6. Distinguish the world of normal waking life from that of (a) madman (b) an animal and (c) dream world (1933).

7. 'Judgment is pronouncing the interpretation of our perceptions to form one system with the data of our perceptions'. Explain.

8. 'Judgment is an affirmation in which our present perception is amplified by an ideal interpretation which is identified with it' Explain.

9. Compare the world of thought to the world of will.

10. 'The ultimate subject in judgment is always Reality' Explain and discuss.

CHAPTER XII.

THE RELATION OF LOGIC TO KNOWLEDGE.

Logic as a Formal Science

What is the relation between logic and knowledge? It is commonly said that logic deals with the form, and not with the content or matter of knowledge. But the relation between form and matter is only *relative.* There can be no form without matter and no matter without form. But at this point Jevons commits a terrible blunder. According to him the different sciences are merely so many logics and there is no difference between logic and other sciences. He also points out that the termination 'logy' in geology, biology etc. means 'logic'. Therefore each science is a special logic, for example, geology is logic applied to the formation of earth's crust, biology is a logic to explain the phenomena of life. But this view is wrong. Logic is not a science which comprises all the special sciences. If so, finding the specific gravity of iron will be a subject in logic. But logic deals only with the intellectual processes involved in the creation of knowledge.

It is equally absurd to call logic as the science of pure form. Symbolic logicians like Boole and Hamilton have emptied logic of any content. They use mere symbols to explain the logical processes. But this view deprives logic of its vital connection with living thought. It substitutes dead and inert symbols for living thought. It must always be

remembered that *form is always determined by content*. If the form is divorced from the content, it will make logic as a science of pure form having no connection with living structure of knowledge. Hence logic must always be studied in its connection with knowledge.

It is evident from the above that form and matter are two inseparable aspects of anything. A medal may be the same in form, although the material out of which it is made may vary. But it can never be pure form; it must be made of some material. *Not merely logic, but all the sciences investigate the form of the phenomena that which remains the same in a great variety of instances.* They study the form in the phenomena and not apart from the phenomena. As Bosanquet says "all sciences are formal........because all sciences consist in tracing out the universal characteristics, the structure that makes them what they are". Physics, for instance, studies the forms, the universal laws or principles, of such phenomena like electricity, light and sound, which appear in countless instances. It finds out the 'forms' or uniformities in things. It is absurd to say that science studies the forms or principles without taking into consideration the concrete facts. In other words, the uniformities exist only in facts and not apart from them. They find their expression in the multitude of facts. For example, the law of evaporation is found in the formation of clouds, and in the steam-power.

Just as physics deals with the form of electricity as it appears in various instances, so also logic studies the *form* of thought as it appears in various instances. But a particular science may be more

general than another, e.g., biology is more general than either zoology or botany. But a very general science is more emphatically formal than a very special science. It deals with the properties that are present in all; that is, it treats a great variety of facts as matter and not as form. In this sense, 'Logic is emphatically 'formal' though not nearly so formal as it is often supposed to be'. In other words, a very general science deals with the characteristics of thought as found in actual knowledge. Logic is a formal science of thought, though it must be remembered that form of thought cannot be separated from actual knowledge.

All science is an expression of thought; the scientist makes use of observation, experiment, hypothesis etc. Evidently these are the subject-matter of logic. Logic investigates thought in all the forms in which it is expressed. Then, we conclude in the words of Bosanquet that Logic is a science dealing with the general properties and relations which all sciences *qua* sciences have in common.

The Nature of a System

What is a system? A system is a whole composed of various parts. A system must be differentiated from an aggregate or heap. A heap of grain or a pile of stones is an *aggregate*. In an aggregate *the whole is the sum of the parts*. The parts are indifferent to each other: one part does not affect the other. But in a system all the parts are mutually related and connected. A steam-engine is a system. The various parts like wheels, pistons, rods etc., are connected together; each part is essential to the other. If one is removed, the whole system is affected; but in an aggregate the whole is not affected if certain parts are removed.

Bosanquet defines 'the whole as constituted by a pervading identity which exhibits itself in the congruous or co-operating nature of all the constituent parts'. The whole is an identity in difference. *The whole is greater than the sum of parts.* The parts in a real whole are mutually related together and essential to the whole. In a word, the whole transfigures the parts. It is by this transformation that its pervading identity makes itself felt throughout all the elements by which it is constituted. The unique quality of the whole seems to be present in all the parts.

This can be understood by means of certain illustrations. Take a painting. It is a whole having different patches of colour. If a patch of colour is removed the picture becomes ugly. This is because that all the parts are essential and go to make up the whole. The relation between the part and the whole is fundamental. They are mutually dependent upon one another. The whole *emerges* out of the parts. It must be remembered however that this relation holds good in a systematic whole and not in an aggregate. To take another illustration. A song is composed of a number of parts. If any one of the parts is omitted, the whole effect is gone. The melody of the song depends upon the various parts of which it is composed. Since the melody is emerged out of the parts; it naturally transfigures the parts and thus makes them its elements.

Such a whole is knowledge and judgment constructs the system of knowledge. Different facts are brought together, arranged and systematised. The ideal of knowledge is to reduce the mass of facts with which it deals to an ordered system.

Distinguish between the singular judgment and the definitory judgment and discuss the logical significance of judgment whose subjects are proper names. (1932).

Ans.—

A demonstrative judgment is a judgment which uses this, now, and here. But in the development of knowledge we do not stop merely with 'this' but we pass on to the perceptive judgment. For example, 'This is red' expands to 'This rose is red' Nevertheless judgments of perception have demonstrative force; hence Bosanquet calls them as singular judgments.

But a definitory judgment drops the demonstrative and relies on qualifying ideas alone. In other words, a *definitory* judgment asserts a connection of attributes. It is hypothetical in character. In it there is no reference to any given perception. A proper judgment is designatory and not definitory, that is, it points to an individual and does not refer to a connection of attributes. It marks a half-way house in the development of knowledge. It has also demonstrative force, e.g., This particular place is Madras.

'The distinctive character of judgment as contrasted with every other act of mind is that it claims to be true'.

EXPLANATION.

A judgment is a stream of consciousness; it has both logical and psychological aspects. If it is a mere psychical presentation it cannot be termed as a judgment. An idea as an identical reference can lay claim to truth. Mere momentary impressions cannot claim truth because they are only in the

psychical level; ideas in the logical sense alone can have any claim to truth. Judgment which claims to be true must have reference to something outside our mere consciousness. A judgment is only true if it refers to reality. We must always distinguish mere psychical occurrences from the system of reality. As Bosanquet says 'There can be no judgment until we distinguish psychical fact from the reference to Reality."

The truth of the judgment consists always in its reference to reality. The subject is always reality and the predicate an idea affirmed of it. 'The logical predicate is always the meaning of an idea; and the claim to be true consists in the affirmation of the meaning as belonging to the tissue of reality at the point indicated by the subject.'

A mere idea can be neither true nor false. It must affirm something of reality. This is the difference between entertaining ideas and affirming them in reality. If we merely entertain an idea, like, 'the student who was late' is not a judgment. A judgment always affirms something about reality. It is an attachment of a significant idea to reality.

EXERCISE. XI.

1. Discuss the relation of the 'form' to the 'matter' of knowledge, and consider if logic may be described as a 'formal science' (1932).

2. Distinguish between singular judgment and definitory judgment and discuss the logical significance of judgments whose subjects are proper names (1932).

3. "A 'whole' is constituted by a pervading identity, which exhibits itself in the congruous or

co-operating nature of all the constituent parts." Explain with suitable illustrations. (1932).

4. Show that all distinction of 'form' and 'matter' is purely relative, and that this relation applies to sciences as well (1933).

5. Discuss in what sense Logic may be called the science of sciences (1932).

6. 'The distinctive character of judgment as constrated with every act of mind, is that it claims to be true' Explain fully the implication of this claim. (1932).

7. 'All science is formal..........Logic is emphatically formal, though not so formal as it is supposed to be' Discuss (1927).

8. What is the truth contained in the statement that 'Logic is a formal science'? Is it purely formal?

9. What is your view of the relation of form and matter in knowledge? In what sense is logic formal?

The Madras University B. A.
Question Papers
1923---1934.

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1923. APRIL.

1. What do you understand by Theory of Knowledge? Do you consider it to be different from Formal logic and Metaphysics?

2. 'No judgment is purely analytic; every judgment is a synthesis of distinguishable elements' Discuss this view.

3. 'All inference is from particular to particular; hence the syllogism is a *petitio principii*'. Examine this view.

... ...

1924. APRIL.

1. What is the problem of logic as theory of knowledge? How do you distinguish it from that of metaphysics?

2. What is your view of the relation of 'form' and 'matter' in knowledge? In what sense is logic formal?

3. "Our knowledge is within consciousness, though it may *refer* outside it." Explain.

4. Argue in general terms whether Mill's methods are weapons of elimination.

... ...

1925. APRIL.

1. What is Bosanquet's view of the relation of subject and object in knowledge, and how does it differ from that of Subjective Idealism?

2. What, according to Bosanquet are the general characteristics of judgment? Illustrate your answer.

3. What characteristic feature does the notion of valid inference involve? Argue the question whether immediate inferences are properly so called.

4. What is your view of the relation between Deduction and Induction?

... ...

1926. MARCH.

1. Examine the logical implications of the theory of Subjective Idealism. What is Bosanquet's view of the relation of subject and object in knowledge, and how is it an improvement on Subjective Idealism?

2. Explain the distinction between form and matter in knowledge. In what sense is Logic formal?

3. Explain the logical significance of each of the three elements in a proposition viz., subject, copula and predicate.

4. In what sense necessity and novelty are features of valid inference? Explain these with special reference to the problem of syllogistic inference.

... ...

1927. APRIL.

1. What is the unit of thought? Discuss whether the distinction between entertaining ideas and affirming them is logically legitimate.

2. 'All science is formal .... Logic is emphatically formal, though not merely so formal as it is supposed to be'. Discuss.

3. State and examine Bosanquet's definition of judgment, making clear the significance of the terms 'idea' and 'reality' employed therein.

4. What are the defects of Subjective Idealism? Does Bosanquet's theory escape them? If so, how?

... ...

SEPTEMBER.

1. What do you understand by the biological principle of evolution, and what is meant by its application to logic?

2. What are the different senses in which the term 'objective' may be, understood, and out of these, which do you favour, and why?

3. What is meant by the logical judgment? What are its essential properties? How would you distinguish it from a grammatical sentence?

4. What is meant by the claim to truth? How is the claim made in judgment? What kind of ideas may be claimed to be true?

... ...

1928. MARCH.

1. What is the problem of Logic as theory of knowledge? How do you distinguish it from that of Metaphysics?

2. 'Our knowledge is within consciousness though it may refer outside it'. Explain this statement so as to bring out Bosanquet's view of the relation of thought and reality.

3. What do you understand by judgments of causal connection? In what sense are they advance on judgments of quality and of quantity?

4. What is the relation between the hypothetical and disjunctive judgments?

5. Describe the general nature of Inductive reasoning, and show its relation to Deductive reasoning.

... ...

SEPTEMBER.

1. Examine the claim of logic to be the science of sciences.

2. What is your view of the relation of form and matter in knowledge? In what sense is logic formal?

3. What are the defects of Subjective Idealism? Is Bosanquet's theory free from them?

4. Examine the view that all inference is from particular to particular.

... ...

1929. MARCH.

1. Explain Bosanquet's view that Logic treats of the mental construction of reality.

2. What is the distinction between entertaining ideas and affirming them? Explain in this connection the significance of the copula.

3. 'System is the ultimate condition of all inference'. Explain.

4. Speaking of induction, it is generally held that formally the reasoning involved is just that of a

disjunctive argument with a hypothetical argument employed in the disproof of the alternatives. Do you agree with this view?

... ...

SEPTEMBER.

1. Define the problem of logic, and distinguish it from that of psychology.

2. 'Disjunctive judgment is not a judgment of doubt but a mode of knowledge.' Explain and examine this view.

3. Do you agree with the view that the relation of subject to predicate in a proposition is one of substantive and adjective?

4. Bradley represents a proposition as ultimately an adjective characterising reality, and Bosanquet as an adjective characterising that fragment of reality with which we are in immediate contact. Explain and illustrate.

5. Show how the same principle underlies the different mental activities of conception, judgment and reasoning.

6. 'Deduction is synthesis; induction is analysis'. Do you agree with this view of the relation between the two?

7. Examine critically the theory that regards correspondence to reality as the test of truth.

8. In what sense, if any, can logic be regarded as the science of sciences.

... ...

1930. MARCH.

1. What are the Laws of Thought and what is their importance for logic?

2. What does Bosanquet mean by speaking of the world as Idea ?

3. What are the general properties of judgment ? Explain them.

4. Show that each judgment is analytic and synthetic.

5. Discuss :—" The disjunction is more than a combination of hypotheticals, and really tends to be categorical and ought to be claimed as conditional".

6. Which are the different possible meanings of Causation ? Which of them do you consider to be the correct one ?

... ...

1930. SEPTEMBER.

1. How does Bosanquet conceive the problem of logic ?

2. How does Bosanquet define judgment ? Discuss its adequacy.

3. What is meant by a judgment claiming truth ?

4. 'Syllogism cannot add to our knowledge, for the conclusion to be valid cannot go beyond the given premises'. Discuss.

5. Do you consider the Law of Contradiction to be the basic law of all thought ?

1931. MARCH.

1. 'The world is an idea ? Explain what use does Bosanquet make of this view in his theory of knowledge ?

2. Explain what is meant by saying that judgment is constructive.

3. Show how far conception, judgment and reasoning are fundamentally of the same type.

4. Bring out the essential distinction between a categorical and hypothetical judgment. What bearing has this distinction on the nature of the universal proposition?

5. Show that inductive reasoning is both analytic and synthetic.

SEPTEMBER.

1. Explain what is meant by saying that judgment is the mental construction of reality.

2. State and examine the properties of judgment.

3. What are the laws of thought? What is their importance for logic?

4. Consider the different possible meanings of causal connection and state which of them seems to you to be satisfactory.

5. Is the disjunctive judgment one of doubt or of knowledge? What is its relation to the categorical and the hypothetical judgments.

1932. MARCH.

1. Discuss the validity of the recognition of three stages of thought: Simple apprehension, judgment and reasoning.

2. Explain the terms analytic and synthetic as applied to judgment, and consider in what sense both characteristics hold of every judgment.

3. 'The whole world, for each of us, is our course of consciousness, in so far as this is regarded as a system of objects which we are obliged to think'. Elucidate.

4. Explain and illustrate the general characteristics of judgment according to Bosanquet.

5. "A whole, is constituted by a pervading identity, which exhibits itself in the congruous or co-operating nature of all the constituent parts". Explain with suitable illustrations.

6. Distinguish between the singular judgment and the definitory judgment and discuss the logical significance of judgments whose subjects are proper names.

7. Explain briefly the law of evolution as applied to thought, with special reference to the relation between sciences and philosophy.

SEPTEMBER.

1. Discuss in what sense Logic may be called the science of sciences.

2. Examine the Law of Identity, as interpreted by the adherents of Equational logic and examine its adequacy.

3. 'Now this is an absolute *cul-de-sac*........ This is the pass to which we are brought by taking common-sense as the guide of theory and not as its material'. At what point is the wrong turning taken? Indicate the approach to a more fruitful theory.

4. Does the passage from judgment to inference illustrate the general law of logical evolution? Explain.

5. Give a brief account of the four types of judgment, according to Creighton and discuss what chronological order, if any, may be recognised among them.

6. Either, 'The distinctive character of judgment, as contrasted with every other act of

mind, is that it claims to be true'. Explain fully the implication of this claim. Or, 'The ultimate subject in judgment is always reality'. Explain and discuss.

1933. MARCH.

1. Distinguish the world of normal waking life from that of (a) madman (b) an animal and (c) the dream world.

2. What is the 'fake turn' taken by the common-sense theory in its attempt to solve the problem of knowledge? Show how the 'fake turn' can be avoided.

3. If the world is the product of the constructive activity of our individual minds, how can we speak of the one Real world, or of truth as being objective?

4. Explain Bosanquet's definition of judgment as the reference of a significant idea to a subject in reality'. What is the relation of the idea and the reality to which it is referred?

5. What is the truth contained in the statement that 'Logic is a formal science'? Is it purely formal?

6. Explain the relation between science and philosophy and apply the distinction to the relation of logic and other sciences.

7. Bring out what is contained in the notion of valid inference. What is the correct way of stating the relation between Deduction and Induction?

SEPTEMBER.

1. Explain the problem of logic as theory of knowledge and compare it with the problem of psychology.

தமிழ்நாடு ஆவணக்காப்பக [illegible]
எழும்பூர், சென்னை 600 008.

தவணைத்தாள்.

சே. எண் : ப. எண் :

வழங்கிய நாள். (1)	திரும்பிய நாள். (2)	வழங்கிய நாள். (1)	திரும்பிய நாள். (2)

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Induction. Do they represent one or two types of inference ?

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